

Farming in Tsetse Controlled Areas

Kenya Project
1999-2004



Lessons Learned



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1 | Acknowledgments

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Veterinary Services, Analabs, American Breeders' Service, Lagrotech, Monsanto, Coopers Kenya, Bayer, HighChem, Vestergaard Frandsen, Kenya Network for Draught Animal Technology, Kenya Conservation Tillage Initiative and Manor House Agricultural Centre, During the six years a number of individuals were employed by the project as consultants in their area of expertise; the contributions of each and every one of these individuals is gratefully acknowledged.

The European Union was the donor for this project and it was implemented through the AU-IBAR. The contributions of a number of different individuals in both organisations and of the members of the Project Steering Committee are gratefully acknowledged. This project was part of a regional programme and an important role was played by the staff from the regional co-ordination unit and the Uganda, Tanzania and Ethiopian projects.

Finally, the project would have achieved nothing without the co-operation of the rural communities of the five districts and it is hoped that the project contributed in some small way to its overall objective, which was improved welfare for these communities.

This document has been put together by StockWatch Ltd., - the Nairobi based technical assistance consultants for the project. The sources of information consisted of project documents and reports produced by project staff and consultants. The opinions expressed herein and any errors that occur are solely the responsibility of StockWatch.

Introduction

The Kenya Farming in Tsetse Controlled Areas (FITCA Kenya) Project was implemented through the African Union/Interafrican Bureau for Animal Resources (AU/IBAR) and funded by the European Union. The project was part of a Regional Programme with national projects in Kenya, Uganda and Ethiopia. Financial and technical support was also provided to Tanzania for three years and to Rwanda in the final year. The FITCA Kenya project funding was Euro 4.6 million and the project was supervised by the Regional Tsetse Co-ordination Unit (RTCUCU) which was accommodated within the AU/IBAR Offices in Nairobi and the powers of the National Authorising Officer (NAO) were delegated to the director of AU-IBAR, who was also the Regional Authorising Officer (RAO).

The project was implemented in five tsetse infested districts in western Kenya: Bondo, Siaya, Busia, Teso and Bungoma and operated from February 1999 to December 2004. A Nairobi Liaison Office was established in AU/IBAR and a Project Management Unit in Busia. The overall objective of the project was to improve the welfare of the people of the region and the project purpose was to improve livestock production. The long-term aim was sustainable tsetse control operated and financed by the livestock keepers.

History - the Ugandan sleeping sickness epidemics

The FITCA regional programme has its origins in the 1980s epidemic of tsetse-transmitted sleeping sickness in South-East Uganda. This epidemic was the third such epidemic in South-East Uganda since the turn of the century. On each occasion the epidemic spread across the border into Kenya.

In 1985 the UK Overseas Development Administration assisted the Uganda National

Sleeping Sickness Control Programme with an active surveillance programme. Three aerial spraying operations, using endosulphan, took place in Jinja and Iganga Districts in 1988 and in Busoga in 1990. Ground spraying took place around the blocks that were aerial sprayed to prevent re-invasion. After two years flies had re-invaded all the sprayed areas. It was concluded that considering the costs of aerial spraying this was not a sustainable approach to the control of sleeping sickness in Uganda and the government abandoned the approach. It has been suggested that the seeds of this 1980s epidemic were probably sown in the Amin era (1971-1979) when the cotton industry collapsed in Uganda. Growing cotton involves bush clearance and heavy insecticide use both keeping the tsetse fly at bay.

A new approach

The European Commission became involved in Uganda in 1987 with Phase 1 of a sleeping sickness control programme. This programme set out to establish a new “environmentally friendly” control technique using simple, insecticide impregnated tsetse traps. The number of cases in Busoga in 1987 was 6,674 and this fell to 223 by 1991. However, in the meantime the disease had spread into Tororo and Mukono Districts.

Kenya-Uganda border

The Organisation of African Unity (OAU) became involved in 1991 in an effort to improve cross-border co-operation between Kenyan and Ugandan tsetse control departments. The OAU, through its IBAR office in Nairobi, provided synthetic pyrethroids in the form of pour-ons to treat domestic livestock and thereby control tsetse flies. While successful in reducing fly numbers, the cost of these pour-ons was considered too high to be sustainable.

In 1992 a team of consultants prepared a financing proposal for a second phase of EU funding for sleeping sickness and trypanosomiasis control in

South-East Uganda. For a variety of reasons, mostly bureaucratic, this was never funded. Meanwhile there was an on-going regional tsetse and trypanosomiasis control programme funded by the EU in southern Africa (RTTCP). The EU was more in favour of another regional programme for East Africa. Funds were available in the EU Regional Indicative Programme and Euro 130,000 had already been given to OAU for a feasibility study in eight East African countries.

The Kenya project

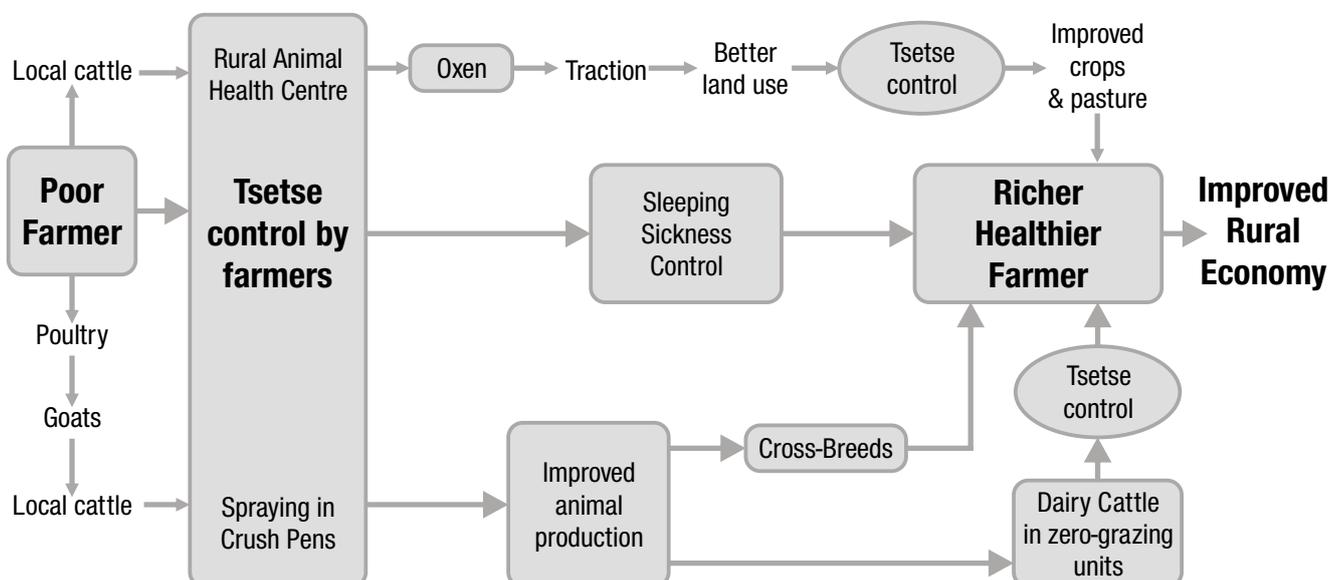
Kenya was an obvious partner in the fight against tsetse in South East Uganda and in 1994 a team of consultants was asked to prepare a feasibility study for Kenya. It was acknowledged in the feasibility study for Kenya that *“If tsetse and trypanosomiasis control is to be effective and sustainable, it cannot depend indefinitely on donors and Government but must depend on the communities whose livestock are threatened and who are the primary beneficiaries of tsetse control.”* However, equally it was accepted that *“Any attempt to achieve sustainable rural development and solve the problems of trypanosomiasis in this region is a very long term task”*. The Kenya project was thus conceptualized in the feasibility study as a two-phase project. “Phase 1 (first four years) will aim to improve awareness amongst the community of the important rural

development issues in the districts and the benefits of integrated crop/livestock production systems”. The aim was “to introduce the newly developed appropriate technology approaches to sustainable tsetse control which have been successful elsewhere in Africa”. These included the use of traps and targets and cattle treated with synthetic pyrethroids. The feasibility study goes on to state “In the second phase of the project it is envisaged that the community will themselves begin to take responsibility for trypanosomiasis and tsetse control and the project strategy will be to continue to promote improved livestock practices and more effective land use systems to enhance agricultural output”.

The Concept

The fundamental concept, illustrated in the diagram below, was to promote tsetse control as an integral part of farming, emphasising private sector involvement, and with the government extension staff in a supervisory role. The project set out to promote:

- methods of tsetse control that could be operated by farmers themselves
- better land use practices that would decrease tsetse habitat
- increased livestock production that would provide the farmer with the incentive and the resources necessary to sustained tsetse control.



3 | The project districts and their people

The five project districts are located in Western and Nyanza Provinces, north of Kisumu, bordering the shores of Lake Victoria and further north, bordering Uganda. At the time of the feasibility study in 1994/5 it was envisaged that the project would operate primarily in what were then just two districts, Busia (Western) and Siaya (Nyanza), together with that portion of Bungoma which was tsetse-infested. By the time of implementation in 1999 Busia had been split into two separate districts: Busia and Teso and Siaya had also become two districts: Siaya and Bondo. While the project area had not increased, as such, there were now five districts with five district veterinary and agriculture personnel each making separate demands for institutional strengthening and expecting their separate problems to be given consideration.

The table below gives some basic statistics on the districts. The human population figures are those from the 1999 census which gives the total human population of these five districts as over 2 million people. The majority of these are Luo, Luhya and Teso engaged in mixed crop/livestock production farming, mostly subsistence. The major crop enterprises are maize, beans, groundnuts, sorghum, potatoes and millet with decreasing amounts of cotton, coffee and tobacco being grown in some districts. The number of individuals per household

is between 4 and 5. Bungoma is the most densely populated of the districts and Bondo the least. The lower population density in Bondo is because much of the low-lying land close to the lakeshore in Bondo is of poor quality; Bungoma by comparison has much more land of higher agricultural potential.

The percentage of the population living below the poverty line is high in all five districts compared to other areas of the country. For example the percentage of the population living below the poverty line in Central and Rift Valley Province is 31% and 48% respectively.

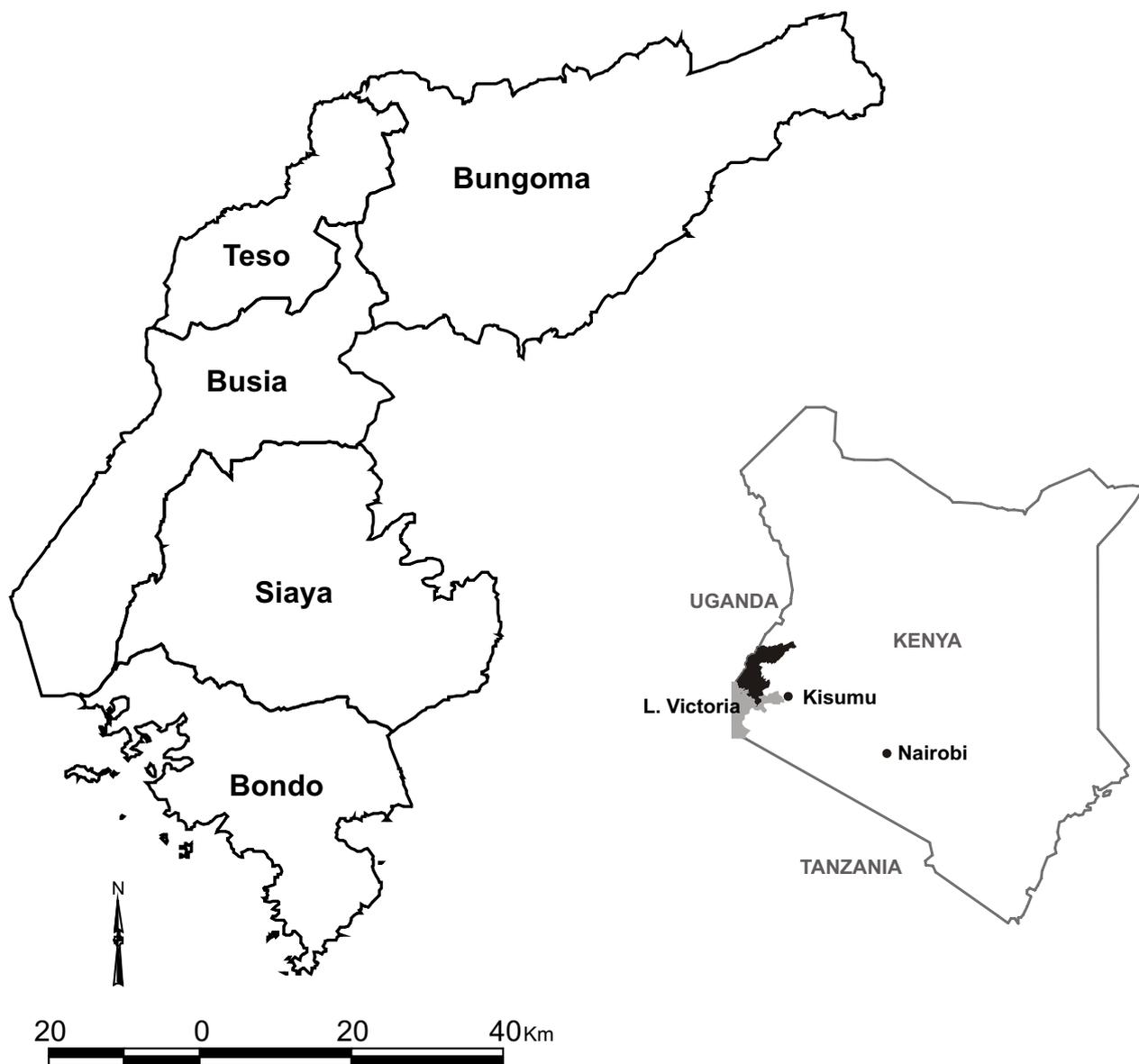
If all the arable land was to be divided between all households then the amount of land available per household varies from 1.05 hectares in Bungoma to 1.40 hectares in Bondo. If the average farm sizes (which are twice to three times the projected area of land available per household) are correct, then a very high proportion (40-65%) of households own no land. Presumably some of these live in urban centres. Nonetheless, the figures for the number of landless households is very high and perhaps casts doubt on the accuracy of the average farm size as given in the district reports. It seems likely that it is in fact far smaller, contributing to the poverty levels in the districts. The proportion of arable land lying uncultivated is also very high (Section 11).

	Area (km ²)	Arable land(km ²)	Pop. ('000)	Pop. density persons/km ²	No. of households ('000)	Ave. farm size (ha)	% h/h with no land	% h/h below poverty line
Busia	1,124	1,106	371	330	82	2.2	39%	67
Teso	559	441	181	325	38	2.6	55%	48
Siaya	1,520	1,263	480	316	118	3.1	65%	64
Bondo	987	796	239	242	57	4.0	65%	71
Bungoma	2,069	1,838	876	424	175	2.0	47%	57
TOTAL	6,259	5,444	2,147	343	470			

Notes: The human population figures are from the 1999 census.

The % poor are from the Central Bureau of Statistics (2003) which used a rural poverty line of KShs. 1,239 per month (< \$1/day).

The average farm size is taken from the district annual reports 1999.



Organisation and administration

During the time of formulation of the Kenya project, the EC Delegation in Nairobi was having difficulties with the implementation of other projects through the then Ministry of Agriculture, Livestock Development and Marketing (MALDM). The regional aspects of FITCA were to be implemented through AU-IBAR (then OAU-IBAR) and the director of AU-IBAR was to act as the RAO. It was agreed between the EC Delegation and GoK that the powers of the NAO for the Kenya project would also be delegated to the director of AU-IBAR.

In addition to the Regional Financing Agreement, separate FAs were signed with Kenya, Uganda and Ethiopia. For each country about one third of the funds were allocated under the National Indicative Programme with the remainder coming from the Regional Indicative Programme. Separate Technical Assistance contracts were signed for the three countries and the Regional Tsetse Co-ordination Unit (RTCUC) in AU-IBAR. For Kenya the Technical Assistance was provided to AU-IBAR, as the contracting authority, by a consultancy company, Rural Development International (RDI) in conjunction with StockWatch Ltd., a Nairobi-based livestock consultancy company. The Technical Assistance contract consisted of 40 man-months of long-term technical assistance and 14 man-months of short-term expertise. The Kenya project was the first of the FITCA projects to commence with the arrival of the Technical Assistant (TA) in early February 1999, followed in March by the arrival of the TA for the RTCUC.

The Technical Assistance contract for Kenya also covered funds for procurement (vehicles, computers etc.), operating and management costs for the Project Management Unit (PMU) and workshops and seminars. An Administrative Order, providing a cost estimate for activities to be

financed under the TA contract, was endorsed by the EC Delegation in June 1999. These activities included the establishment of a Nairobi Liaison Office (NLO) housed in AU-IBAR, a PMU in the Veterinary Department District Offices in Busia and the hiring of local project staff. The 1st Work Programme and Cost Estimate (WP&CE) was endorsed in July 1999 and funds for the implementation of the 1st WP&CE were made available through an AU/FITCA (Kenya) European Development Fund (EDF) Imprest Account in September 1999. A second account was opened in Busia to facilitate easy disbursement of funds. The signatories on both these accounts were representatives of AU-IBAR, the TA consultancy company and project staff.

A Project Steering Committee, chaired by the Director of AU-IBAR, was established and consisted of representatives from the MALDM (namely the Director of Veterinary Services and the Director of Livestock Production), the Ministry of Health, and the EC Delegation, the TA to the RTCUC, the Kenya TA (Project Manager) and the Kenya Liaison Officer.

Day-to-day administration and field activities were the responsibility of the TA/Project Manager who was based in Busia but visited Nairobi regularly. The Nairobi Liaison Office dealt with matters related to the RTCUC, the EC Delegation and the headquarters of the Veterinary Department and the Department of Livestock Production. All major procurement was done through the Nairobi office where the project financial controller was based. Accounts were submitted from the PMU in Busia to Nairobi where they were prepared and submitted for quarterly auditing. The auditing was supervised and funded under the Regional Programme.

The Financing Agreement (FA) for the whole FITCA project, which expired in December 2002, was extended for 2003 and, following a consultancy mission to formulate an Exit Strategy, the project

was extended for a sixth and final year. During the final year, 2004, the project management was handed over to GoK. This was considered by the Exit Strategy consultants to be essential to ensure ownership and thereby sustainability. However, financial control remained in the hands of AU-IBAR and the TA contract was extended, again with AU-IBAR, for the final year to provide short-term technical input only.

Planning and implementation

The FITCA Kenya FA was for four years but the feasibility study for Kenya, which provided the implementation details for the project and developed the first logframe, clearly indicated that the project goal and purpose could not be achieved within the time frame of a four year project.

The logframe for the **first WP&CE** was based on the original project logframe. The overall objective was “*improved welfare of the people of the region*” and the project purpose was “*increased livestock productivity*”. There were four result areas:

1. Tsetse and trypanosomiasis control
2. Education and training
3. Rural development
4. Institutional strengthening

A Participatory Rural Appraisal (PRA) exercise was conducted by a local company and financed under the TA contract during the first six months. However, apart from this, the first WP&CE was developed with little input from the various stakeholders. This seemed necessary at the time because of the pressure to submit a WP&CE quickly and have funds released as soon as possible. The first work programme was extended until the end of December 2000 and the principal activities undertaken involved the collection of baseline data. GoK extension staff, Kenya Trypanosomiasis Research Institute (KETRI - now KARI-TRC), the International Livestock Research Institute (ILRI)

and the University of Nairobi became involved in various stages of the collection and analyses of this baseline data (Section 6).

A series of stakeholders' workshops at district level and a final national stakeholders' meeting were held in late 2000 to develop the second WP&CE. A further stakeholders' meeting was held between the project, AU-IBAR, government departments, KETRI and private sector representatives to establish agreed roles for the various players involved in the implementation.

Seven results were defined in the **second WP&CE** based on the outcome of the district workshops referred to above. These were modified slightly in subsequent logframes but the overall goal and the project purpose remained the same. Activities were defined to achieve:

1. Improved animal health delivery systems
2. Draught power and cattle development
3. Poultry development
4. Human resources capacity development
5. Optimal channels for delivering extension messages to farmers established
6. Optimisation of control strategies against *Glossiana fuscipes fuscipes*
7. Socio-cultural practices that may constrain the project activities established

Lack of funding for government departments and institutes was identified from the beginning as a key problem for project implementation. Emphasis was therefore placed on private sector involvement. GoK's declared policy was to withdraw from the provision of clinical services and artificial insemination (AI). Reduced budgetary allocations to the Veterinary Department at district level meant that there was no money for tsetse control. The project therefore set about encouraging the private sector to become involved and empowering the farming communities to take responsibility for tsetse control.

Problems

The EC Delegation commissioned a feasibility study in preparation for the Kenya project but there was little or no other preparation done in advance. Thus neither the GoK extension staff nor the farming communities were initially aware of the objectives.

The financial constraints experienced by GoK departments and institutes, particularly in the project area, seriously constrained their capacity to fulfil the role originally envisaged for them as partners in project implementation.

The control of funds by AU-IBAR rather than a line ministry led to resentment by GoK officers who saw themselves as mere implementing agents for the project with no real control of the funds. This resentment, apparent both at headquarters and in the project districts, led to considerable ill-feeling among the various stakeholders.

Lessons

The Kenya project came into being as a means of providing EU funds for Uganda to control sleeping sickness. Such a top down approach and the initiation of the project from the EC itself in Brussels meant that many of the fundamentals of project design were not in place at the outset.

The provision of funds under the TA contract for procurement and hiring of local staff was an efficient mechanism allowing for certain activities to commence before the release of funds for the first WP&CE.

The project would have benefited from baseline information collected in advance. The data available on livestock numbers and disease from GoK were and are totally inadequate for the design of such a project.

Proper data collection and analyses systems should have been set up, possible at a regional level.

The implementation of the Kenya project through AU-IBAR and the establishment of the EDF Imprest Account under AU-IBAR were efficient and effective in ensuring rapid disbursement of funds for activities that benefited the farming communities.

The poverty levels in the districts and the impact of HIV/AIDS had not been anticipated at the outset of the project.

Projects designed to work in rural areas with GoK officers need to have provisions for capacity building and allowances.

The implementation of the project and its sustainability would have benefited greatly if the project had made better links with effective NGOs working in the project districts.

5 | Summary of activities and achievements

More details of the various project activities are provided in the sections that follow.

Two major outbreaks of trypanosomiasis were successfully controlled during the time of project implementation, one in Teso and one in Bondo. The project involved GoK staff in mobilising and educating the farming communities. The *G. pallidipes* tsetse species that was responsible for the disease transmission, was successfully reduced by over 95% using odourbaited insecticide-impregnated targets (Section 7).

An agreement was reached with the Kenya Veterinary Association Privatisation Scheme (KVAPS) to assist in establishing private veterinary practices in the project districts. Refresher training courses and AI training were provided for both private and government veterinarians and private animal health assistants (Section 10).

A short-term expert was employed to advise on draught animal power after which the technology was promoted together with NGOs and GoK extension officers (Section 11). A private company and the Kenya Agricultural Research Institute (KARI) were used to promote the use of improved, disease resistant cassava varieties (Section 12). Conservation tillage was also introduced to the farmers (Section 13).

A pharmaceutical company became involved with the project in the provision of vaccination for poultry against Newcastle disease (Section 13).

Negotiations were started with micro-financing companies in an effort to encourage the provision of micro-financing for the farming communities but for a variety of reasons it was difficult to find a satisfactory solution in the context of a donor funded project.

The private sector also became involved with GoK extension officers in project training activities and field days, demonstrations and farmer exchange visits were organised for hundreds of farmers.

The project's long-term strategy for tsetse control was the use of cattle sprayed with insecticide (Section 8). The farmers erected crushes and the project assisted them with purchasing spray pumps and insecticides. Private veterinarians were used by the project to assist in the establishment of the crush pens and the formation of farmers' spraying group committees

A private sector company became involved with the project in trials to protect dairy cattle in zero-grazing units from tsetse challenge (Section 9). These trials were experimental in nature and insecticide impregnated netting was provided to the farmers free of charge.

A pharmaceutical company supported the project and GoK staff in research work aimed at finding ways of controlling *G. f. fuscipes*. Trials were conducted on an island in Lake Victoria (Section 15).

6 | Baseline surveys

The project undertook a number of baseline surveys in the initial years to provide information on the socio-economic status of the rural communities in the project districts and the farming systems in place. The project purpose was “increased livestock production” thus the focus of these surveys was livestock agriculture and in particular livestock disease with an emphasis on cattle, tsetse and trypanosomiasis.

The Participatory Rural Appraisal

This was undertaken by a private Nairobi-based social and market research company. The survey was conducted in one village in each of the five

project districts between July and August 1999. The project sociologist joined the team conducting the survey. The communities' problems, ranked in order of importance by the villagers, are shown in the box below.

The PRA revealed a level of poverty not previously recognised by those involved in the project. It also became apparent that traditional beliefs were deeply imbedded in these communities and many common cultural practices had a negative impact on development.

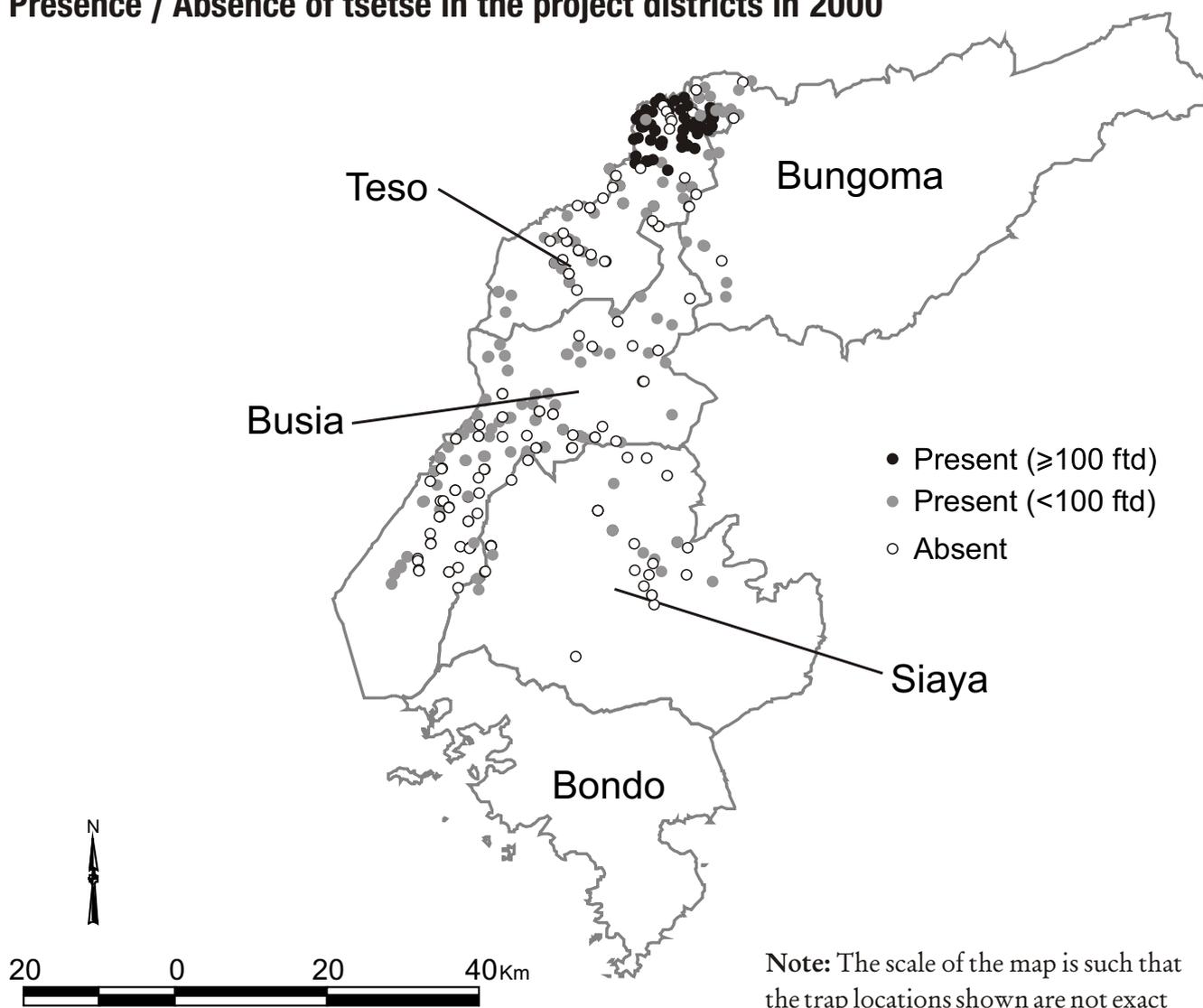
District	Village	Problems
Busia	Sigulu	Low incomes, human diseases, livestock diseases, bad leadership and ignorance
Teso	Kokare	Poverty, ignorance, limited income generating activities, livestock diseases
Bungoma	Lwanja A	Human diseases, low farm yields, livestock diseases, low incomes, hunger
Siaya	Swilla	Poverty, inadequate capital for farming, poor infrastructure, livestock diseases, human diseases
Bondo	Magare	Human diseases, water, poverty, livestock diseases, livestock theft

The Household Survey

This survey was conducted in August 2000 with assistance from the Agriculture Extension staff of the districts. Sixty sub-locations were sampled and 20 households in each sub-location were questioned. The objective of the survey was to gather baseline data on livestock types and numbers, livestock diseases and household activities. The data were analysed by a department within the University of Nairobi. However, the data were never properly analysed, the report was not produced in good time and in many cases the results were presented in a confusing manner and consequently misinterpreted by the project staff.

Data from 1175 of the 1240 households sampled were used in the final analyses. Of these 1175 households, 905 (77%) kept cattle. As this is probably an overestimate of the proportion of households that keep cattle (see Livestock Census below) it seems that this survey was biased towards cattle keeping households. As with the PRA, poverty, human health, food insecurity and water were the major concerns of the households surveyed. The survey focused on collecting information on trypanosomiasis and found that this disease was ranked as highest in importance in Teso District and that trypanocidal drugs were widely used.

Presence / Absence of tsetse in the project districts in 2000



The Tsetse Survey

KETRI conducted this survey on behalf of the project between February and April 2000. Veterinary Department and project staff assisted and a short-term consultant was employed to design the survey and introduce KETRI staff to the use of Geographical Positioning Systems (GPS) and the collection of data suitable for input into a Geographical Information System (GIS). The survey used bi-conical traps baited with attractant odours. Two traps per square kilometre, were placed in appropriate sites for four days and emptied, recorded and checked after every two days. The trap positions were identified by sub-location and village, and geo-referenced.

The survey concentrated on areas of reported *G. pallidipes* infestation. This species is a more efficient transmitter of the disease in livestock and towards the end of the 1990s was being reported increasingly as a problem in areas of Busia and Teso, previously considered to have been infested only with *G. f. fuscipes*. The maps shows the areas surveyed, mostly in Busia and Teso, and the places where each fly species was found. The *G. pallidipes* density was highest in Teso District with over a thousand flies per trap per day (ftd) found at some sites. This fly species was associated with more dense vegetation especially on hill slopes and in settlements away from river valleys. *Glossina f. fuscipes* was more associated with water edge vegetation.

The Livestock Census

Accurate figures on livestock numbers are very difficult to come by. The last comprehensive livestock census in Kenya took place in the 1960s. The figures given in the third column of table below are those available from district reports in 2000; these are projections/guesses from the 1960 figures.

A variety of figures appear in a variety of documents produced by the project or from other sources. For example, the Bungoma District Development Plan for 1996-2001 gives a figure of 28,000 for the number of cattle in the district in 1995. In 2000 a FITCA project consultant gives the District Report figure of 240,000 cattle while a figure of 340,000 appears in another FITCA report in 2001. The FITCA household survey estimated that on average each household in the five project districts owned 4.5 cattle. Bungoma has 175,000 households and, at 4.5 cattle per household, the cattle population would be 787,000; clearly many households do not own cattle but the question of *how many* remained uncertain.

The FITCA livestock census conducted in 2000/2001 concentrated on Busia and Teso. Seventy two percent of households (58,700 out of a total of

82,000) in Busia and 58% (22,000 out of a total of 38,000) in Teso were sampled. In the table below the total number of cattle in the two districts has been estimated, based on the percentage of households sampled, to be 104,000 for Busia and 32,000 for Teso. Combining the data from the two districts gives the average number of cattle owned per household to be 1.12. This contrasts with the figures produced by the FITCA Household Survey in which 905 households were found to keep 5324 zebu cattle, or 5.9 cattle per household. The Busia disease survey undertaken by the project gives an estimate of 4.5 cattle per household. Clearly the disease survey sampled mostly cattle keeping households and it seems likely that the Household Survey was also biased towards cattle keeping households. If the evidence suggesting that many households appear to own no land is correct (see Section 4) then either these landless households graze their cattle on roadsides or communal land or cattle keeping is restricted to fewer farmers with an average ownership of more than 4.5 cattle per household.

District	Households 1999	Cattle 1999	Cattle per household 1999	Households FITCA survey	Cattle FITCA survey	Cattle per household in FITCA survey	Cattle in district (projected from survey.)
Busia	82,000	182,000	2.1	59,000	75,000	1.3	104,000
Teso	38,000	39,000	1.0	22,000	19,000	0.9	32,000
Siaya	118,000	118,000	1.0				
Bondo	57,000	94,000	1.6				
Bungoma	175,000	240,000	1.4				
	570,000	673,000	1.2				

Note: FITCA survey done in Busia and Teso only.

Cross-sectional Livestock Disease Surveys

Busia

This was undertaken as part of a PhD thesis study by a KETRI scientist supported by the FITCA project. The study is entitled “Epidemiology and importance of trypanosomosis and tick-borne diseases on the performance of cattle and small stock in Busia District, Kenya”

The main objective of the study was to assess the prevalence of tsetse-transmitted trypanosomosis and other vector-borne diseases (e.g. anaplasmosis, babesiosis, cowdriosis and East Coast fever [ECF]) in cattle and small ruminants.

Some of the findings of the survey were that livestock keeping (cattle, poultry, pigs, sheep and goats) was perceived as an important activity and that the average number of cattle per household in the district was reported to be 4.5 overall and highest in Budalang'i and Funyula division with a mean of 7.3 and 5.9 respectively. Ninety five percent of the respondents kept poultry. The perceived important livestock diseases were trypanosomosis, tick-borne diseases and helminthosis in that order.

The epidemiological survey revealed an overall trypanosome prevalence in cattle in Busia District of 4.7%. In sheep, the overall mean trypanosome prevalence was 2.7% while no infections were detected in goats. The prevalence was highest in the divisions where cattle numbers were highest. The tick-borne diseases survey indicated that cattle were more exposed to anaplasmosis than ECF and babesiosis. The exposure to anaplasmosis within the district ranged between 23.3% and 66% while that of ECF was between 1.2%-12.0% and babesiosis 0-15.6%. Over 50% of animals had moderate to high tick infestations. The report provides recommendations for tick control. Worm burdens

were found to be high in calves, sheep and goats. The observed high early calf mortality rates and stunted growth in cattle in the districts is most likely a result of heavy worm burdens from early calthood. Antihelmintic analysis carried out under a KARI/DFID project in the 1990s indicated that many of the products available to farmers throughout the country have little or no active ingredient. The FITCA survey report contains recommendations for treatment regimes and effective anthelmintics.

Bungoma

A similar, though less detailed survey, was commissioned by the project in Bungoma District in 2001. The disease survey was carried out in three divisions of the district and involved sampling 1,040 cattle, 80 in each of 13 different sub locations. A total of 28 cases of trypanosomiasis (overall prevalence rate of 2.7%) was detected, seven of these in the eighty cattle (8.8%) examined in one location. Sixty four cases of ECF (6.2%) were detected and the prevalence of this disease was fairly uniform through the different locations. Babesiosis (2.4%) and anaplasmosis (2.9%) were also detected and, as in Busia, worm burdens were generally high.

Lessons

Baseline data needs to be available at the initial stages to guide project planning.

Baseline data on indicators must be collected at the beginning of the project. However, it is often difficult to decide on appropriate indicators at that stage.

The project found data collection to be much easier than data analyses. Much time was wasted on collection of data that were never properly analysed

Teso District

In September 2000 the Director of Veterinary Services received a letter from the Office of the President urging him to take measures to control tsetse in Teso District. Tsetse control has long been considered the responsibility of the Veterinary Department and ground spraying has been the method of choice. Reduced financial and human resources have made it difficult for the Veterinary Department to sustain control. Thus the FITCA project was requested to assist.

Very high densities of *G. pallidipes* (over 1000 flies per trap per day at some sites) had been found in Teso during the initial project tsetse survey (Section 6) in February and March 2000. The project therefore proposed a control scheme using odour-baited insecticide-impregnated targets, developed in the 1980s in Zimbabwe, and successfully used in many parts of Africa. The project also proposed involving the communities in the control scheme thus enabling them to understand the disease and its control and encouraging them to become more self-reliant in the face of tsetse challenge.

Firstly, an intensive survey of both the tsetse populations and the trypanosomiasis disease prevalence was undertaken in those high challenge areas of Teso already identified in the initial tsetse survey. These surveys were used to demonstrate various aspects of the vector and the disease to the farming communities. Meanwhile community groups were chosen for training in target and trap making and some 3,400 targets/traps were produced. Over 1,000 target attendants were trained in target and trap servicing and maintenance. The target attendants were given incentives in the form of chickens, cassava cuttings etc. in return for their labour.

As part of the community awareness and mobilisation campaign a series of simple posters

covering various aspects of tsetse and trypanosomiasis were produced. Two thousand copies of each poster were distributed, in early 2001, to offices of Chiefs and Assistant Chiefs, divisional headquarters, schools, hospitals, churches and veterinary departments in the project area.

The first targets were installed in June 2001 and between then and October 2001, 2322 odour baited targets were deployed over an area of approximately 560km². Targets were neither stolen nor vandalized. They were serviced and maintained by the trap attendants for twelve months by which time a reduction of over 95% in tsetse numbers had been achieved (see figure opposite) and infection rates in cattle had dropped accordingly. Subsequently tsetse control was maintained through the use of cattle sprayed with insecticide (Section 8).

A total of 518 traps were used during the target operation for monitoring tsetse populations at monthly intervals. These traps were operated by the target attendants. The project staff also monitored the changes in the tsetse population using 20 geo-referenced traps in two high tsetse density areas in Teso District. Monthly monitoring at these two sites continued until May 2004. The figure below shows the change in the *G. pallidipes* population over a 40 month period. This included a pre-intervention phase, the target operation followed by the period when insecticide treatment of cattle was introduced.

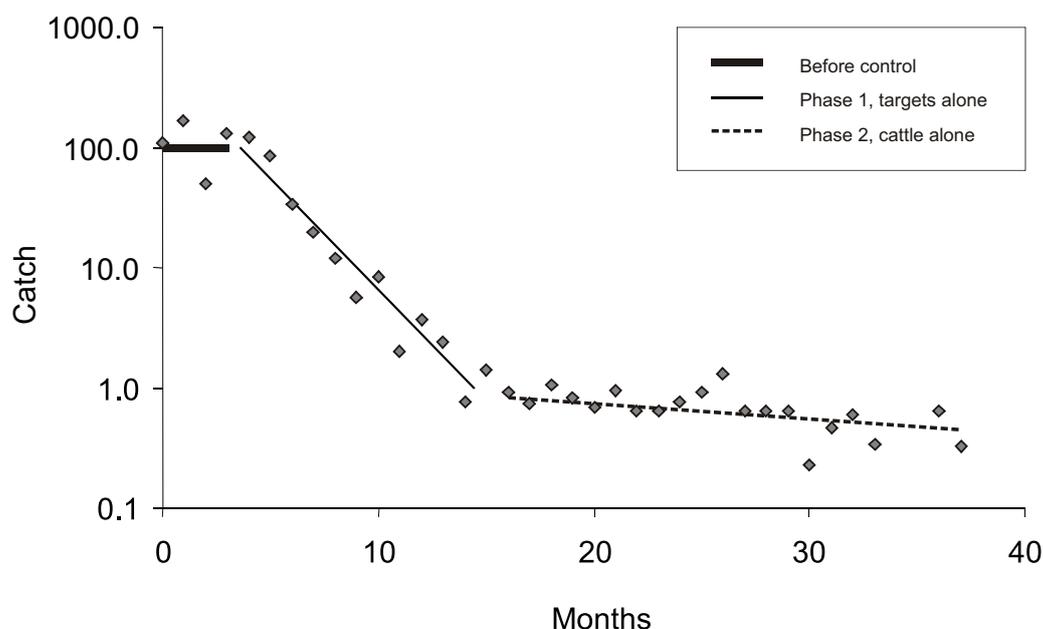
Bondo District

While the target control operation was in full swing in Teso District in the middle of 2001 reports in Bondo District of cattle deaths from trypanosomiasis began to surface. Bondo had previously been considered a low risk area for the disease and had not been included in the initial tsetse survey (Section 6).

The problem appeared to be centred in just one division of the district: Rarieda. Project and district staff undertook a tsetse survey in the division in July 2001 and found tsetse densities of over 80 *G. pallidipes* per trap per day at some sites. A target

control operation was mounted, similar to the Teso campaign, using 458 targets in an area of over 100 km² and 73 monitoring traps. The targets were removed after six months by which time the fly numbers had been reduced to under five flies per trap per day.

Decline in tsetse numbers in Teso



Lessons

These campaigns served to introduce new methods of participatory tsetse control to government staff and provided the farmers with a major role in solving their own problems.

The campaigns changed the attitude of livestock farmers towards trypanosomiasis. It is no longer viewed as an incurable disease

The community's willingness to participate in tsetse control was influenced by their experience and knowledge of trypanosomiasis. Those who had suffered most from trypanosomiasis cooperated best.

A proper costing of these control campaigns would have provided useful information for the Veterinary Department for the future. The use of

incentives to involve the community in the operation is likely to have been more cost effective than employing government personnel and it also ensured the safety of the targets.

Tsetse control campaigns using traps and targets need external funding and can only be recommended in emergency situations to bring down fly numbers to manageable levels, which can then be maintained through other tsetse and trypanosomiasis control strategies. This conclusion is based on the outcome of target and trap operations elsewhere in Africa. It is difficult to maintain the communities' interest once the fly numbers have been reduced. However, it should be stressed that in emergency situations insecticide impregnated targets provide effective and rapid control.

8 | Tsetse control through livestock spraying groups

The project policy for long-term tsetse and trypanosomiasis control was through the use of synthetic pyrethroids (SPs), insecticides applied by the livestock keepers directly to their cattle; the so-called “live bait technique”. This approach had proved successful in many other African countries and in some parts of Kenya. Only SPs in the form of pour-ons were registered for sale in the project districts at the start of the project. These products are expensive and in 1999, one commercial pour-on containing flumethrin, which is one of the least effective of the SPs, was being promoted in the districts. The product was being promoted as a repellent, suitable for the protection of individual animals from tsetse attack, rather than as an insecticide.

None of the available synthetic pyrethroids are repellents; tsetse will bite a sprayed animal and can transmit disease but the tsetse fly will later die. If the pyrethroid is used on enough cattle in an area, reductions in tsetse fly numbers and finally effective tsetse control can be achieved.

In Uganda, the most effective SP, deltamethrin, had been in use in a spray/dip formulation, considerably cheaper than the pour-on formulation, since the early 1990s. Farmers had been encouraged to build crush pens, where there were no dips, and the commercial company producing the formulation, assisted with the provision of pumps and an initial amount of the insecticide. FITCA Kenya took farmers and government veterinary officers from the project districts to Mukono District in Uganda to see how the scheme operated. On their return to Kenya the farmers were encouraged to build crush pens and establish committees to collect 40% of the cost of a spray pump. The project assisted by paying the balance for the spray pumps and providing one litre of deltamethrin. At the same time, the project liaised with the Veterinary Department and the

spray/dip formulation of deltamethrin was registered for use in the project districts.

These crush pens were operated by the committees and farmers were charged for each animal sprayed and a fund established to purchase more insecticide. The project then used these crush pen spraying groups as entry points for various other activities and they were promoted as Rural Animal Health Centres (RAHCs). Private animal health service providers were encouraged to attend spraying days and to provide farmers with services for their livestock such as de-horning, castration, deworming etc. Demonstrations and field days on various aspects of crop/livestock production were held around these centers.

Efforts were made by the project to train crush pen committee members on management and despite many failures (see below) a reasonable number of these centers continued to operate. A survey conducted toward the end of 2003 involving 193 RAHCs found that over 40% were still operating in Bondo, around 30% were operating in Siaya, Teso and Bungoma and 20% in Busia. Twenty-five of the 193 crush pens surveyed had been vandalized. It was estimated that close to 3000 cattle were being sprayed at two weekly intervals at the 69 operating centres. Twelve hundred of these were in Bondo District.

In 2004, two extension leaflets were produced by the project, one of the “*Formation and Management of Livestock Spraying Groups*” and one on giving “*Technical Guidelines for Livestock Spraying in Tsetse Infested areas*” which included the environmental considerations. Also in 2004, Livestock Farmers' Field Schools were promoted. This was done in an effort to improve the sustainability of the RAHCs, particularly the training element. District staff were provided with training and 11 farmers' groups, associated with the RAHCs were provided with seed money to establish Livestock Farmers' Field Schools.

Problems

The targets for the number of RAHCs established were generally met in each of the five project districts. By the end of January 2003, some 300 crush pens had been built and committees established and a further 67 centres were established during 2003. However, it soon became apparent that the failure rate was high.

Private veterinarians were paid a fee to assist farmers in the establishment of RAHCs. In many cases the private veterinarians were overenthusiastic in establishing as many centres as possible but not enough effort was made to ensure that these spraying groups would be effective.

In some cases the farmers themselves saw an opportunity to benefit from project assistance and formed their own crush pen committees with inappropriate people as committee members. Once the spray pump and the initial litre of insecticide was forthcoming, interest in maintaining a revolving fund or providing services waned.



Lessons

Change is possible and through this initiative the project introduced what was a new tsetse control method for non-emergency situations. This method of tsetse control can be managed by farmers themselves and the government veterinary services were willing to support this approach and promote its adoption in other districts.

There was insufficient time to ensure sustainability. With the end of the project looming the project staff tried to do too much too quickly and the number of RAHCs established became the priority rather than effectiveness of operation.

The long term aim as stated in the Financing Agreement for this project was “sustainable tsetse control organised and financed by the livestock owners”. The economic realities of this long-term aim were never sufficiently considered. Comprehensive cost-benefit analyses should have been undertaken for all of the project interventions.

The poverty and education levels of the farming communities are such that it will take considerable time before they are in a position to take full responsibility for tsetse control.

If the tsetse control achieved by the project is to be maintained it will be necessary to spray between 5 and 10% of the cattle at two-weekly intervals in infested areas. The Veterinary Department must continue with disease surveillance and ensure that the farmers continue spraying.

9 | Tsetse control in zero-grazing units

The Kenya Finland Livestock Development Project operated in western Kenya for ten years, beginning in the early nineties. Exotic dairy cattle, mostly Friesians, were introduced and farmers were encouraged to keep these under zero-grazing conditions. However, the mortality rates were high and trypanosomiasis was found to be a major factor. The FITCA project embarked on an experimental trial to test the efficacy of insecticide impregnated netting placed around the zero-grazing unit to protect cattle from tsetse flies and trypanosomiasis. Various strengths of netting, impregnated with insecticide by various methods were supplied by a private company.

Tsetse fly behavioural studies indicate that tsetse generally fly at no more than a metre above the ground and do not see the thin black netting, only the cow inside. They collide with the netting picking up enough insecticide to kill them or knock them down. The zero-grazing units were surrounded by treated netting, initially two meters high and later reduced to one and a half meters. The impact of the netting was almost immediately obvious. There were fewer flies (both nuisance and biting) inside the units and the cows spent less time trying to keep the flies off and more time eating.

The farmers claimed that their cows were healthier and producing more milk, that milking was an easier and more hygienic business with fewer flies about, and some farmers even reported that there were fewer mosquitoes in their houses. Neighbouring farms also appeared to benefit.

Theoretically, the insecticide impregnated netting around zero-grazing units should operate like targets with the cows inside providing both a visual and the odour attractant. Four targets per km², each target being less than one m², was sufficient to quickly reduced fly numbers in 560 km² of Teso. What density of netted zero-grazing units would be required to provide similar control? Also this system has the advantage that the wealthy farmers, those who own dairy cattle, are providing tsetse control for their less privileged neighbours keeping indigenous cattle.

The protection of zero-grazing units was perhaps one of the most exciting and innovative activities undertaken by the project. However, despite the sound theoretical basis to the method, the obvious reduction in fly numbers and the farmers' enthusiasm, the problems encountered were many.



Problems

The first batch of netting was impregnated with insecticide by project staff and this appears to have been successful. Some later batches of netting impregnated with insecticide by the supplier did not work. This seems to have been due to different strengths of the netting and different methods of impregnating the netting with insecticide.

The commercial company were interested in the project conducting trials with various types of netting but little effort was made to get the product registered, or to promote its use or make it commercially available to farmers. Thus the netting was never widely available for sale and could only be purchased from the PMU or through the few private veterinarians who were given supplies by the PMU.

It was difficult to find enough cows in zero-grazing units in the heavily tsetse-infested areas of the districts to allow for a conclusive trial on the impact of the netting on trypanosomiasis incidence.

It proved very difficult to produce good quantitative data to substantiate the hypothesis that netting around zero-grazing units decreases disease and/or increases production. Milk yield is subject to a vast range of both genetic and environmental sources of variation and the data available from protected and non-protected zero-grazing units was insufficient to show statistically significant differences in milk yield.

The trypanosome infection rates in the area were generally less than 5%, making it difficult to demonstrate statistically significant reductions in infection rates. This was the case even when the data from protected cows were broken into two groups to allow for cows which did not spend all their time within the units (partially protected) to be classified as a separate group from those that were protected 24 hours a day.

There were statistically significant difference in mean packed cell volume (PCV) in protected and non protected cows and while this is a measure of overall health, and particularly a strong indicator of the presence or absence of trypanosomiasis, it was not possible to ascribe the difference in PCV to lower trypanosome prevalence rates.

Lessons

The project's efforts to combine research and development (through the provision of improved management practices to the farmers) largely failed. Clearer distinctions should have been made between the research and development aspects of this trial.

A memorandum of understanding should have been drawn up between the project and the company whereby the obligations of each side (both financial and otherwise) were clearly stated and the project's obligation to promote the farmers' interests was recognised as the most important aspect of the work.

All netting should have been tested for efficacy before being released to the farmers. Some simple initial trials should have been conducted to determine the persistence of the insecticide on the various types of netting and the flies' response to the various textures of netting.

The netting needs to be installed around the unit in such a way that an apparently open view of the cow is presented to incoming tsetse flies.

Despite the farmers' enthusiasm, the "free hand-out" syndrome prevailed. Many of the farmers who received the initial batch of netting, and sometimes replacement netting, free of charge were subsequently reluctant to purchase the netting themselves. A survey conducted in late 2004 found that only ten of the 47 farmers who participated in the original trial had purchased replacement netting.

The trial should have been better designed with advice from a statistician.

The trial should have involved the collection of more comprehensive "before and after data" on fly numbers, disease incidence and production traits and it should have been conducted, if possible, in an area of high tsetse challenge.

10 | Private animal health delivery services

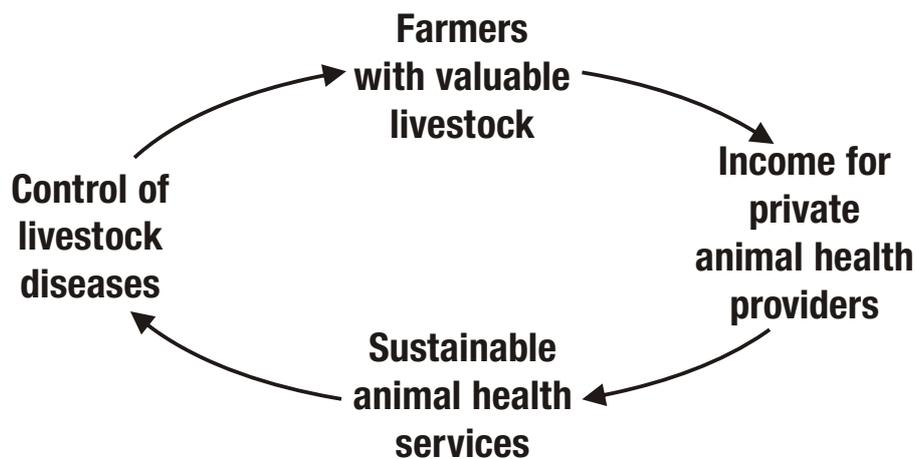
A veterinarian and an agricultural economist were employed as consultants in 2001 to assess the animal health delivery system in the five districts and consider the viability of private animal health services. They reported that the “resources available for the delivery of animal health services, both public and private are very limited, and declining in the case of the public sector”.

Constraints to private veterinary practice identified by consultants.

- Lack of capital (by services providers and farmers)
- Inappropriate legislation
- Cultural attitudes with a negative impact on

- livestock productivity
- Limited number of commercially valuable livestock
- Limited upgrading through AI or bull camps
- Unfair competition from government staff and quacks

The consultants considered that there was greater potential for the provision of animal health services through Animal Health Assistants (AHAs) and Community Animal Health Workers (CAHWs) than for veterinarians because of the limited number of commercially valuable livestock. They recommended that private veterinarians would need to offer a variety of services to establish sustainable businesses.



The Vicious Circle

This consultancy identified yet again the difficulties faced by the project in kick-starting any sustainable improvement in agricultural productivity in such impoverished rural communities. This type of

vicious circle, as illustrated above, applied to many interventions and the project frequently wondered *where to start?*

Achievements

The project requested assistance from the EU funded Kenya Veterinary Association Privatisation Scheme (KVAPS). The scheme has concentrated on providing loans for veterinarians to establish practices mainly in the high potential areas with small-scale dairying. KVAPS advertised, selected candidates and provided loans for the establishment of four veterinary practices in the project area.

The project provided motor cycles and paid for refresher courses in diagnostics for the veterinarians. In addition, the project initially provided income and introduced these veterinarians to the farmers by contracting them for various project surveys and activities such as the establishment of the crush pen spraying groups (Section 8).

The project provided training for AHAs in simple diagnostic techniques and treatment. They were also trained in AI and AI kits were provided to each project district for use by private veterinarians and AHAs. The project encouraged AHAs and veterinarians to work together in networks.

Problems

The Veterinary Department refused to recognise the AI training given to the AHAs through the American Breeders' Service.

Many farmers were unwilling to pay for animal health services.

Some of the private veterinarians relied too much on project support and failed to establish successful businesses.

There was competition between the veterinarians and AHAs thus the establishment of networks rarely worked.

Lessons

A clearer understanding, possibly in the form of MOUs, should have been established between the project and the private veterinarians with regards to the nature, conditions and duration of project support.

Private veterinarians had considerable problems in establishing viable private practices in the area. As predicted by the consultants there is more potential for AHAs, charging lower fees, than for fully qualified veterinarians. The farmers do not recognise the situations where a veterinarian can provide a more cost effective service than an AHA.

The establishment of viable private animal health delivery services is a long-term exercise dependent on many factors and requires a radical change in mind-set both on the part of the government veterinary services and the farmers.

The attitudes of the individual District Veterinary Officer to private animal health services proved critical in determining the success of the veterinarian in the district.

The project life span was insufficient to ensure a substantial increase in commercially valuable animals and thus provide the necessary impetus for sustainable animal health services.

The AI kits were provided during the final year of the project through the District Veterinary Offices. The Veterinary Department is no longer supposed to be involved in the provision of AI, yet it remains to be seen if these kits will be passed on for use by the private sector providers as intended.

Until the stated policies of the Veterinary Department with regard to the role of the public and private sectors in animal health services delivery are accepted and properly enforced, the provision of private animal health services in such medium potential districts will be an uphill task.

Well-cultivated, productive farmland with good pastures and subsistence or cash crops is synonymous with reduced tsetse habitat. Bush clearing has played an important role in reducing tsetse habitat throughout much of Africa and crops that require insecticide (despite the negative environmental implications of such) provide an additional tool in the fight against tsetse infestation. The collapse of the cotton industry in Uganda during the Amin era is believed to have been instrumental in fuelling the 1980s epidemic of sleeping sickness in South East Uganda. The decrease in cotton production in western Kenya in recent years likewise may have contributed to the increase in tsetse infestation in the project districts.

Farmers throughout the project area have for many years been using draught animals, usually six to eight oxen teams, for ploughing. In the mid 1990s, many farmers lost their cattle, including draught animals, to disease (probably trypanosomiasis). In 2000 the project employed a draught animal technology (DAT) specialist to provide an assessment of the use, importance and potential of draught power and to advise the project on how and where it might best intervene.

The findings of the consultancy indicated that, while there was a strong tradition of the use of animal traction in the districts, it was currently under-utilised. Where animal traction was used it was mainly for ploughing and sometimes weeding. Many farmers were unaware of its potential for ridging, planting, groundnut lifting and conservation tillage activities. As much as one third of the arable land in the districts was estimated to be uncultivated. In Busia and Siaya and particularly in Teso, abandoned farmland was directly attributed to the death of draught animals and “floating” (idle) ploughs were common. Promotion of animal traction through demonstrations and training was recommended.

The project hired a staff member from a local NGO that had experience in training farmers on DAT technologies. This individual oversaw the implementation of the FITCA DAT activities, which included demonstrations on one-acre plots and training

farmers in the use of a pair of oxen for ploughing, planting, weeding and transport. The district and division Mechanisation Officers from the Ministry of Agriculture and Rural Development directly implemented the DAT activities in their respective districts.

Achievements

The first DAT field day for farmers was held in conjunction with the Kenya Network for Draught Animal Technology (KENDAT) in Teso District in November 2000. Some 500 farmers participated in a variety of activities including a ploughing competition. Field days were held over the next four years.

Twenty-five one-acre demonstration plots were set up throughout the project districts. The farmers who owned these plots were provided with fertiliser and certified seeds (sorghum, finger millet and maize). On farm training was provided for oxen owners and handlers. Over 3,300 farmers participated in demonstrations of improved DAT for ploughing, planting, weeding and transport and over 120 farmers were trained to make and use modern planting and weeding yokes.

Manor House Agricultural Centre trained 25 Ministry of Agriculture staff and 25 farmers on plough adjustment and standard yoke making and use. A member of staff from the centre was also used to provide a one week residential training course at the Siaya Farmer's Training Centre. A private firm in Naro Moru trained four artisans and five district Mechanisation Officers on manufacture of ox-drawn carts and making of puncture free wheels for the carts.

Many individual success stories were recorded where farmers purchased animals or equipment and achieved new productivity levels. New farmers groups were formed to engage in DAT activities.

In its final year the project produced a comprehensive extension message entitled: “*Animal Power: more crops, higher incomes, less effort*”.

Problems

The poverty levels in the districts, compounded by the lack of rural credit, are such that the majority of farmers were unable to find the resources necessary to benefit fully from DAT.

As with many other project interventions some farmers expected free handouts and were unwilling to invest even when they had the capacity.

Crop production activities have to be scheduled precisely. During some years unusually heavy rains or the early onset of rains interfered with DAT activities. Time delays for other logistical reasons, including the slow release of funds from the EU, also led to the cancellation of some activities while rendering others ineffective.

Changes in the structure and responsibility of various government ministries during 2003 lead to Mechanisation Officers being allocated different duties. Many of these individuals had been provided with training under the project and were heavily involved in the implementation of DAT activities.



Lessons

Women constitute 70% of smallholder farmers but farming implements and draught animals are traditionally owned and controlled by men. Men therefore will take responsibility for ploughing leaving the planting and weeding activities to the women and children. Introducing DAT to plant and weed meant that the men now participated thus reducing the work burden on the women.

The promotion of the use of pairs of oxen rather than a team of six or eight oxen was particularly successful. A farmer with six oxen now had three teams that could use the same equipment more efficiently and achieve the recommended crop spacing more easily. There is also reduced soil compaction by treading when only a single pair of oxen is used.

While many farmers participated in demonstrations and field days, there were indications in many cases that the exposure to the new technologies was insufficient to ensure sustainability. Animal traction technologies, for ploughing, planting, weeding and transport, including the use donkeys, that reduced labour and improved productivity were demonstrated but many farmers only adopted one or two of the technologies at a time and rarely the complete package. Mere attendance at a demonstration does not constitute any meaningful training. More rigorous in-depth training should have been undertaken. Farmer to farmer exchange visits on application of DAT would also have improved adoption rates. The Farmers' Field School approach (Section 8) may assist in making these interventions more sustainable.

The paucity of animal health services in the area renders investment in draught animals a risky business.

Cost-benefit analyses of the introduction of these technologies would have been useful.

The availability of credit to small holders for agricultural inputs is essential if any improved technology is to be adopted on a wider scale. This should be a primary concern of the government in its efforts to implement its new *Strategy for the Revitalisation of Agriculture*.

Stakeholders' workshops were held in September 2000 in each of the five districts to identify priority areas of intervention for the project. These workshops provided the primary ideas for the formulation of the second and subsequent work programmes. Cassava was identified as an important food security crop, continuing to produce under drought conditions when maize and sorghum have failed. African Cassava Mosaic Virus Disease (ACMVD) was identified as the primary constraint to production of this crop. Infection rates of 80-90% were recorded in Siaya District and in Teso District and it was estimated that, during the previous decade, the acreage under cassava fell from 3000ha to 1000ha with most of the local varieties succumbing to ACMVD.

The Kenya Agricultural Research Institute (KARI) had produced new cassava varieties that were more productive and tolerant to the ACMVD. FITCA together with a private agricultural company acquired these new varieties from KARI and distributed them to the farmers. The project paid for the costs of cutting the planting material from KARI bulking farms and paid for the transportation costs of the material to new bulking sites. The beneficiary farmers prepared the land for the new bulking sites, managed the crop to maturity and were free to sell planting material to recover their production costs.

In some divisions, individual farmers or farmers' groups bulked the cassava on a five acre block, in other areas neighbouring farmers with adjacent pieces of land joined up to make a bulking farm. Women's groups, church groups and other NGOs became involved in the activities with bulking sites varying in size from a quarter acre upwards. Over 120 acres of cassava were established as bulking plots between August 2001 and August 2003 with project support. Assuming a 75% survival rate of the crop in the established plots with a potential multiplication ratio of 1: 10 comes to over 800 acres from the initial bulking plots.

Staff from the PMU together with the relevant agriculture/crops officers from the various districts provided the farmers with training on cassava husbandry and certified the material produced on their bulking sites. The project purchased cassava cuttings from these bulking sites to provide to farmers who had operated as target attendants in the tsetse control schemes in Teso and Bondo.

The project through GoK home economics officers provided demonstrations on cassava processing and utilisation introducing a wide variety of different cassava products to the farmers. Cassava stakeholders' meetings were requested and held in four of the five districts.

Problems

Cassava production is labour intensive and the price of cassava products is relatively low. Difficulties were encountered in getting farmers' groups to collaborate effectively in this activity.

Management of more than a one acre cassava bulking plot proved difficult for the individual farmers due to the weeding requirements.

Farmers expected to receive cassava-planting material free and many of the farmers that bulked cassava had difficulty selling the planting material. At some cassava bulking sites, the cassava cuttings were provided in return for labour at weeding and at tuber harvesting.

Lessons

The new cassava varieties have production potentials of up to 35 tonnes per hectare compared to the local varieties with a production potential of 10 tonnes per hectare.

Bulking of cassava planting material is best done by individual farmers rather than jointly by a group of farmers and bulking sites should be one acre or less.

As with other project activities, on-farm training/demonstrations on cassava production, processing and utilisation requires intensive follow-up to be truly effective and sustainable.



13 | Conservation tillage

The shortage of draught animals (Section 11) and lack of access to credit to buy animals and DAT equipment led the project to promote a new approach to increasing land cultivation. Together with the Kenya Conservation Tillage Initiative and government staff the project introduced conservation tillage to the project area. Conservation tillage is a system based on minimum soil disturbance and reduced labour requirements. The new crop is sown into the stubble of the old and weeds are controlled by the application of pre- and post-emergent herbicides. Advocates of conservation tillage claim it is particularly beneficial on erosion and drought prone land, but its sustainability, based as it is on the continual use of agrochemicals, and the long-term impact on soil fertility are questionable.

The project employed a number of approaches to create awareness about and to promote conservation tillage:

- Organising visits for 75 farmers and 15 extension officers to farmers in Uganda who practiced conservation tillage
- Working with a herbicide manufacturer to jointly fund and organise awareness raising sessions and training on use of herbicides for farmers and extension officers
- Establishing four 0.5 acre demonstration sites in each of the 25 divisions of the project area. On each site half of the land was ploughed, planted and weeded by either hand or draught animals and compared to the other half that was sprayed with post emergence herbicides for land preparation and pre-emergence herbicides for weeding
- Holding field days around some of the demonstration plots
- Supplying spray pumps to groups of farmers on a subsidised basis. The objective was to create 'spray gangs' in each division who would be available for contract spraying.

Problems

Uptake of this new approach was low; of 75 farmers who visited Uganda just three adopted conservation tillage in the first season after the tour.

Following the awareness raising and training activities, and despite the involvement of the manufacturer, herbicides were often not available locally. Even where they were available the packs (5 litres) were too expensive for farmers.

Farmers did not take advantage of the opportunity to acquire spray pumps at subsidised rates, expecting instead that the pumps would be distributed free of charge.

Lessons

Support and training over a longer period may have resulted in more successful adoption of this new approach. Although uptake by farmers was poor, some project and extension staff did adopt the technology suggesting that the approach, though effective, was probably too expensive for most farmers.

The herbicide company did not consider that the project area represented a viable market for their herbicides and was unwilling to bear the full cost of awareness or training. One positive development was the introduction by the company of smaller, more affordable pack sizes of the key herbicides.

Comparative costs and yields were recorded at each of the 100 demonstration plots but there was little effort made to summarise the results or analyse the data.

14 | Poultry

The household survey, and the district workshops conducted in 2000 pointed to the importance of indigenous poultry for the rural communities. Around 90% of households keep poultry. Newcastle Disease (NCD) was identified as the main constraint to poultry production.

The objective of the project interventions in poultry development was to increase household income through increased poultry production and thereby improve food security. The project, in conjunction with the government extension officers, private veterinarians and a private pharmaceutical company, organised demonstrations/training and field days for farmers. These were aimed at:

- Reducing chick mortality rates through disease control with an emphasis on NCD vaccination.
- Introducing farmers to improved poultry husbandry practices including the provision of housing and supplementary feeding.



At the beginning, women's groups were used as an entry point for on-farm demonstrations and later the community livestock spraying groups participated. The project provided fuel and allowances for GoK extension workers and purchased vaccine for the vaccination campaigns. The project met its targets for numbers of on-farm demonstrations and farmer field days held and for number of farmers attending. Over 3000 households benefited and over 160,000 birds were vaccinated and about 30% of the participating farmers constructed simple houses for their birds.

Lessons

The NCD vaccine is thermo-stable and produced in flasks of 500 doses each. The vaccine must be diluted with water and then used within three hours. The farmers need to organise themselves into groups to vaccinate sufficient birds simultaneously to use the 500 doses.

Using women's groups rather than the livestock spraying groups is the best way of ensuring active participation of women as the women do not regularly attend the livestock spraying.

Insecticide and triflumuron treated target trial

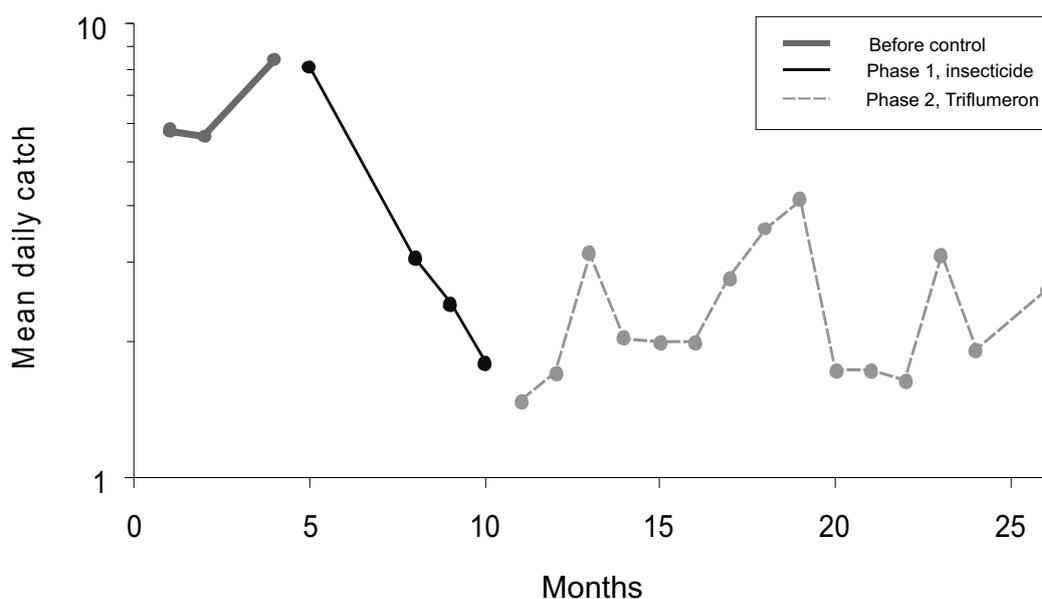
Mageta Island, is located in Lake Victoria about 4.5 km from the mainland of Bondo District. The island is roughly a kilometre wide and about 5km. long and has a history of human and animal trypanosomiasis. There is only one species of tsetse fly on the island, *G. f. fuscipes*, and it is an ideal place to test control options for this species about which little is known.

A two-phase trial to test the efficacy of targets, treated with two different chemicals, took place during 2003 and 2004. Initially, insecticide treated blue/black targets were used and these proved effective in reducing the tsetse numbers. The second phase of the trial involved treating the targets with an insect growth inhibitor/sterilising agent: triflumuron. This was a form of tsetse control that could be classified as a Sterilised Insect Technique (SIT) but much less expensive than the production and release of males sterilised using radiation.

As there are no known attractants for *G. f. fuscipes* the first question to answer was “could the fly be killed using un-baited targets?” Targets were placed at a much higher density than those used in the tsetse control operations in Teso and Bondo (28 targets per km² as opposed to four per km² for the odour baited targets for *G. pallidipes* control). In the first phase of the trial 170 targets, impregnated with a synthetic pyrethroid, beta-cyfluthrin, were placed along the island shore at about 100 m intervals. In the second phase these were replaced with 272 triflumuron treated targets placed at 50 m intervals. Twenty monitoring traps were used to monitor the tsetse population throughout the trial.

Trial Results

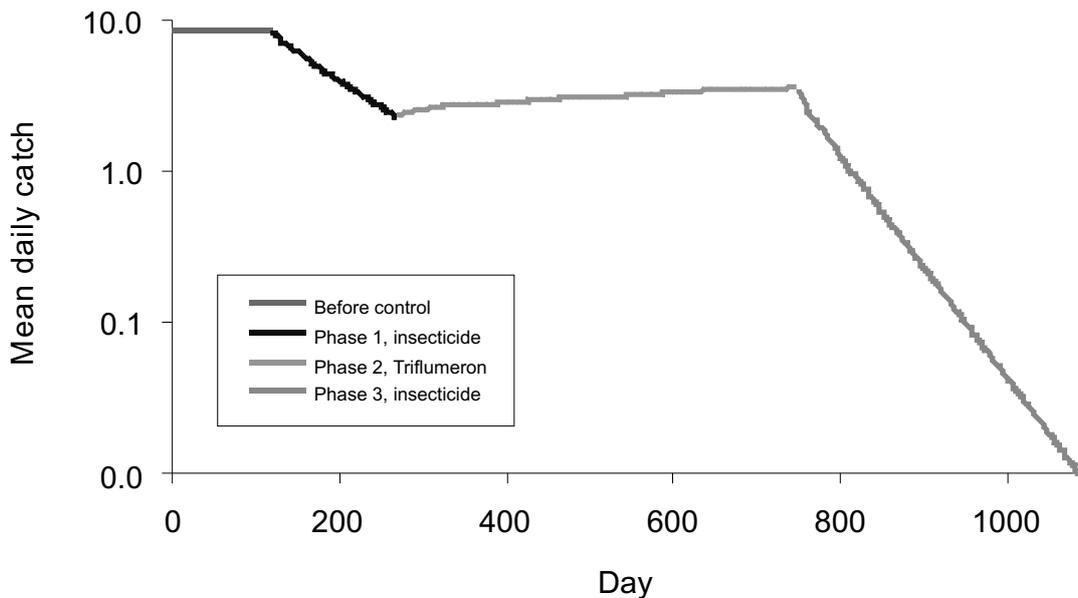
- During Phase 1 (Insecticide) the catches **declined** by an average of about 21% per month.
- During Phase 2 (Triflumeron) the catches **increased** by an average of about 1.5% per month.



Modeling results

A consultant tsetse expert reviewed all the FITCA tsetse operations during the last year of the project. He demonstrated, through a modeling exercise, that the insecticide impregnated targets could eradicate the flies from the island in a period of less than one year (see graph).

Money has been allocated through the GoK budget to the Veterinary Department for insecticide treated targets to be re-installed on Mageta Island in order to completely eradicate the fly from the island.



Lessons

Glossina f. fuscipes can be killed using un-baited insecticide impregnated targets at high densities.

There was some evidence that the triflumeron was interfering with the reproductive rate of the flies but this did not result in tsetse control, let alone in eradication.

This trial provided a useful comparison of the effectiveness of killing flies with that of sterilising flies, as a control/eradication technique. Killing flies with insecticide was far more effective than sterilising them.

THE LESSONS LEARNED FROM THIS TRIAL ARE IMPORTANT IN VIEW OF FUTURE PLANS TO USE SIT TO ERADICATE TSETSE FROM THE LAKE VICTORIA BASIN

The Mid-Term Review

The whole FITCA programme was evaluated through a Mid-Term Review (MTR) that took place between April and June 2002. The evaluation team was provided by an Italian company Development Researchers' Network and consisted of an agricultural economist (team leader), a sociologist, a human tropical diseases expert and a veterinarian. In the summary of their report on the programme as a whole (covering four countries, Kenya Uganda, Ethiopia, Tanzania and the regional co-ordination) they commented on various aspects of the programme:

- Under “Project preparation and design” they stated that the FITCA concept was “a concept insufficiently developed and Project Cycle Management inadequately mastered and utilized as planning, management and monitoring tool”.
- Under “Relevance” their judgment was summarised as: “A relevant concept and relevant programme with the exception of some components and activities”.
- They consider efficiency as “far from satisfactory” and effectiveness and impact as having “very little to show yet”.
- Sustainability had “still to be proven” and they “reserved judgment” on reproducibility.

Yet, despite what can only be regarded as a highly critical review, in their conclusions and recommendations they stated “Subject to satisfactory performance determined by a Completion Evaluation Mission, a further no-cost extension until December 2004 to be used to prepare a second phase is recommended”. Their evaluation of the Kenya country programme, while acknowledging some achievements, was still fairly damning. There was a general consensus amongst the project staff and those involved in the management of the Kenya project that the

evaluation team in many cases failed to grasp some of the objectives of the project or to understand the reality of the project working environment. In many cases criticisms were made but there were no clear recommendations as to what corrective actions might be taken. Some, though by no means all, of the recommendations made for the Kenya programme were put in place during the last two years.

Consolidation and Exit Strategy

Consultants were employed in mid-2003 to review the entire FITCA programme and its progress since the MTR and specifically to:

- Establish a consolidation strategy to the end of December 2003
- Establish a justification, if any, for a one-year no-cost extension
- Suggest a general strategy for another phase, if justified
- Review the contribution and relevance of the continuation of AU-IBAR as the regional co-ordinating body of FITCA.

In the summary of findings for Kenya the consultants state that since the MTR “advances have been made in all the main activity components and in all the target districts”. The consultants considered that the major task facing FITCA Kenya was to review all the results achieved to date and to create documentation for dissemination purposes.

They considered that the hand-over of the management of Kenya project to the government was essential to ensure ownership and sustainability.

Final Evaluation

A British based firm, Agrisystems, provided a team of three experts including a tsetse expert, for the final evaluation of the entire FITCA programme. This took place in October/November 2004 and

the report was generally accepted, by the EU, AU and project management and staff, as providing a balanced and fair evaluation of the Kenya project. In contrast to the MTR they considered that “the project's field operations were mainly efficient and effective” and they expressed the opinion that “overall the FITCA concept is a sustainable intervention, but more detailed information needs to be collected before a final judgment can be made.” However, they were critical about the lack of effective monitoring and evaluation and they concluded that “more information is available in the FITCA projects that has not been reported”. With reference to the Kenya project specifically they considered that “significant progress was made towards achieving project objectives and towards the development of sustainable technologies for farming in tsetse controlled areas”.

EU Monitoring:

In addition, the Kenya project was monitored through three separate visits (2000, 2001 and 2002) from an EC Brussels appointed monitoring team. The third visit coincided with the MTR in May 2002 and the evaluation was in stark contrast to that provided by the MTR with the project scoring “b” (good) for three out of five criteria namely: Efficiency of implementation to date; Effectiveness to date and Potential sustainability.

Participatory Impact Assessment

A Participatory Impact Assessment was conducted by the project itself in the final year. The aim was to capture the farmers' perspectives of the project. Farmers were interviewed at ten sites, two in each of the five districts. The five villages, which participated in the original PRA (Section 6), were used again together with five other sites, which had been included in the baseline household survey (Section 6).

Farmer's expectations and concerns:

- They expected to be provided with improved breeds by the project
- They perceived the FITCA project as a lending agency and expected to be given loans
- The short life-span of the FITCA project was a concern.

Project Impacts as perceived by farmers:

Household level impacts varied from district to districts but frequently mentioned were:

- Increased food production
- Improved household income
- Increased awareness of better poultry husbandry practices
- Increased milk production.

Community level benefits, also varied but commonly mentioned were:

- Increased cattle numbers
- Reduced tsetse populations
- Reduced livestock diseases.

Sustainable tsetse control

Sustainable tsetse control will only be achieved through the participation of rural communities who will benefit financially from the control measures. Tsetse control methods that can be funded and operated to a large extent by the farmers themselves are most likely to be sustainable.

Tsetse control through spraying or dipping cattle with synthetic pyrethroids is currently the best method available. If the tsetse control achieved by this project is to be sustained in the five project districts, it will be necessary to spray about 5-10% of the cattle at two-weekly intervals. Disease surveillance by the Veterinary Department must be maintained.

The priority areas for sustainable tsetse control projects in Kenya are areas where there is a high tsetse challenge, a high proportion of grade animals, a market of livestock products and farmers with sufficient income to pay for and thereby sustain private animal health delivery services.

Rural/agricultural development projects

Government funding for agriculture has been drastically reduced over the last two or three decades. It is now such that only essential core services can be sustained. It is difficult for GoK to play a supportive counterpart role in projects such

as this and provision of donor funding through effective NGOs, who already have viable operations on the ground, should be considered.

The project would have benefited from baseline information collected in advance. A year at least of a pre-project phase would have allowed for the preparation of better targeted and focused work plans. Much data was collected during the six years of the project but more time should have been spent on the synthesis and analyses of the data/information collected, particularly the economic aspects. Better monitoring, evaluation and impact assessment of the various interventions would have allowed the project to learn and re-focus where necessary.

Rural development, involving livestock development, particularly in poor uneducated communities with high poverty rates, is a long-term exercise. The project aimed, through various interventions, to gradually raise living standards such that farmers could be self-sufficient. This type of programme, in poor farming communities, should only be considered if long term (minimum ten years) donor funding can be assured from the outset.

Sustainability will only be achieved if farmers can clearly see the economic benefits of adopting new agricultural technologies. Even then farmers with no access to credit can only benefit from technologies that require little or no financial input.



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